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| EXAMINER | |
|---|---|
| WANG, LEMING | |
| ART UNIT | PAPER NUMBER |
| 2638 | |

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Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/774,308 | VIEIRA ET AL. | |
| | Examiner | Art Unit | |
| | Leming Wang | 2638 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *06 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16,18 and 20-22* is/are rejected.

7)☒ Claim(s) *17,19,23 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 13 recites the limitation " the filter " in line 4. There is insufficient antecedent basis for this limitation in the claim. Claim 13 is dependent of claim7, and there is no filter claimed in the claim 7.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 6, 7, and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ahn et al.* (US Pub. No: 2003/0231382) in view of *Sekiguchi* (US Patent No: 6,195,188)

Regarding claims 1 and 7, *Ahn et al.* teach a method of using an optical circuit to transfer information of an information-bearing signal from a first wavelength (Data signal $\lambda 1$, Fig.4B) to a second wavelength (Converted signal $\lambda 2$, Fig.4B), the optical circuit

having an input port (The first port of the circulator 390 receiving Data signal λ1, Fig.4B), an output port (The third port of the circulator 390 output converted signal λ2, Fig.4B), and a laser diode (DBR laser, Fig.4B, [0046]), the method comprising: (a) inputting into the input port an information-bearing signal having the first wavelength (The circulator 390 receiving Data signal λ1, Fig.4B), and (ii) generating a converted information-bearing signal by transferring the information of the polarization-adjusted information-bearing signal from the first wavelength to the second wavelength (Data signal λ1 is converted to signal λ2, Fig.4B), and (d) outputting from the output port the converted information-bearing signal (The third port of the circulator 390 output converted signal λ2, Fig.4B).

The system of *Ahn et al.* differs from the claimed invention in that *Ahn et al.* do not teach a polarization controller in communication with laser (*Sekiguchi* teaches using a polarization controller in front of a laser, for example, 3, Fig.7, Col.3, line 4); and the polarization controller receiving the information-bearing signal (The polarization controller 3 in front of a laser receives the WDM signal, Fig.7), and the polarization controller adjusting the polarization of the information-bearing signal (Col.6, line 3); and the laser diode receiving the polarization-adjusted information-bearing signal from the polarization controller (Laser 1, Fig.7). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to adapt the method, such as the one of *Sekiguchi*, in the system of *Ahn et al.* by installing a polarizer controller in front of the converter of *Ahn et al.* to change the polarization direction of the

input signal to fit one of the two polarization modes of the laser in order to obtain maximum gain in wavelength converted signal (λ2, Fig.4B).

Regarding claim 2, the system of *Ahn et al.* differs from the claimed invention in that *Ahn et al.* do not teach (e) amplifying the information-bearing signal having the first wavelength (*Sekiguchi* teaches using amplifier, 53, before the laser, Fig.7). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate optical amplifier, such as the one of *Sekiguchi*, in the system of *Ahn et al.* to enhance the input signal in order to perform wavelength conversion with high sensitivity as weaker signals input.

Regarding claim 6, the system of *Ahn et al.* differs from the claimed invention in that *Ahn et al.* do not teach adjusting the polarization of the converted information-bearing signal (*Sekiguchi* teaches adjusting a polarization controller in front of a laser, Col.6, line 3. Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to adapt the method, such as the one of *Sekiguchi*, in the system of *Ahn et al.* by adjusting a polarizer controller in front of the converter of *Ahn et al.* to in order to obtain maximum gain in wavelength converted signal (λ2, Fig.4B).

Regarding claim 20, The system of *Ahn et al.* differs from the claimed invention in that *Ahn et al.* do not teach the laser diode transmits the converted information-bearing

signal to the polarization controller which adjusts the polarization of the converted information-bearing signal (*Sekiguchi* teaches using a post polarization controller after laser, for example, 6, Fig.7); and the polarization controller receiving the information-bearing signal (The polarization controller 3 in front of a laser receives the WDM signal, Fig.7), and the polarization controller adjusting the polarization of the information-bearing signal (Col.6, line 3). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to adapt the method, such as the one of *Sekiguchi*, in the system of *Ahn et al.* by installing a polarizer controller after the converter of *Ahn et al.* to adjust the polarization direction of the output signal from the converter to obtain maximum gain in wavelength converted signal ($\lambda 2$, Fig.4B).

Regarding claim 21 *Ahn et al.* teach a laser diode (DBR, Fig.4B) in communication with the information-bearing signal ($\lambda 1$ data signal, Fig.4B), the laser diode transferring the information of the information-bearing signal from the first wavelength to the second wavelength using cross-gain modulation ([0004]).

Regarding claim 22, as discussed in above, in the system of *Ahn et al.* modified by *Sekiguchi*, *Sekiguchi* teaches a polarization controller (3, Fig.7) adjusts the polarization of the information-bearing signal ($\lambda 1$ data signal of *Ahn et al.*) having the first wavelength prior to the laser diode transferring the information to the second wavelength ($\lambda 2$ converted signal of *Ahn et al.*).

5. Claims 3-5, 8-12, 14-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ahn et al.* (US Pub. No: 2003/0231382) in view of *Sekiguchi* (US Patent No: 6,195,188) and further in view of *Suzuki et al.* (US patent No: 5,754,714).

Regarding claim 3, the system of *Ahn et al.* modified by *Sekiguchi* differs from the claimed invention in that *Ahn et al.* and *Sekiguchi* do not teach amplifying the converted information-bearing signal (*Suzuki et al.* teach using a post amplifier, 903, Fig.6, *Suzuki et al.*). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate post optical amplifier, such as the one of *Sekiguchi*, in the system of *Ahn et al.* and *Sekiguchi* to enhance the converted signal in order to obtain stronger converted signals.

Regarding claim 4, the system of *Ahn et al.* differs from the claimed invention in that *Ahn et al.* do not teach (e) amplifying the information-bearing signal having the first wavelength (*Sekiguchi* teaches using an amplifier to enhance input signal, 53, Fig.7). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate optical amplifier, such as the one of *Sekiguchi*, in the system of *Ahn et al.* to enhance the input signal in order to perform wavelength conversion with high sensitivity as weaker signals input.

The system of *Ahn et al.* and *Sekiguchi* differs from the claimed invention in that *Ahn et al.* and *Sekiguchi* do not teach amplifying the converted information-bearing signal (*Suzuki et al.* teach using a post amplifier, 903, Fig.6, *Suzuki et al.*). Therefore, it

would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate post optical amplifier, such as the one of *Suzuki et al.,* in the system of *Ahn et al.* and *Sekiguchi* to enhance the converted signal in order to obtain stronger converted signals.

Regarding claim 5, the system of *Ahn et al.* modified by *Sekiguchi* differs from the claimed invention in that *Ahn et al.* and *Sekiguchi* do not teach filtering the converted information-bearing signal to suppress or eliminate the first wavelength (*Suzuki et al. teach* using a narrow band filter, 902, after a wavelength converter, 901, Fig.6, Col.7, lines 52-55). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate optical filter, such as the one of *Suzuki et al.,* into the system of *Ahn et al.* modified by *Sekiguchi* in order to obtain a stronger output signal with a particular wavelength.

Regarding claim 8, *Ahn et al.* teach a routing device in communication with the polarization controller and the filter (In the system of *Ahn et al.* and *Sekiguchi* modified by *Suzuki et al., Ahn et al.* teach a circular 390 as a routing device in Fig.4B), and the routing device (i) directing the information-bearing signal having the first wavelength to the polarization controller (The signals in the circular are direct to from the output port to the input port because signals are traveling only in clock-wise rotation, Fig.4B of *Ahn et al.*), and (ii) directing the converted information-bearing signal to the filter (The signals in

the circular are direct to from the converter port connecting with 270 to the output port because signals are traveling only in clock-wise rotation, Fig.4B).

The system of *Ahn et al.* modified by *Sekiguchi* differs from the claimed invention in that *Ahn et al.* and *Sekiguchi* do not teach filtering the converted information-bearing signal to suppress or eliminate the first wavelength (*Suzuki et al. teach* using a narrow band filter, 902, after a wavelength converter, 901, Fig.6, Col.7, lines 52-55). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate optical filter, such as the one of *Suzuki et al.,* into the system of *Ahn et al.* modified by *Sekiguchi* in order to obtain a stronger output signal with a particular wavelength.

Regarding claim 9, the system of *Ahn et al.* and *Sekiguchi* modified by *Suzuki et al.* teaches an amplifier in communication with the routing device for amplifying the information-bearing signal having the first wavelength (In the system of *Ahn et al.* and *Sekiguchi* modified by *Suzuki et al., Ahn et al.* teach a circular 390 as a routing device in Fig.4B, routs the amplified signal input signals $\lambda 1$ from the amplifier of *Sekiguchi* incorporated in the system of *Ahn et al.* into the converter 270/400 of *Ahn et al.* in Fig.4B).

Regarding claim 10, the system of *Ahn et al.* modified by *Sekiguchi* differs from the claimed invention in that *Ahn et al.* and *Sekiguchi* do not teach an amplifier in communication with the filter for amplifying the filtered converted information-bearing

signal (*Suzuki et al.* teach using a filter 902, and post amplifier, 903, Fig.6). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate optical filter and post optical amplifier, such as the ones of *Suzuki et al.,* into the system of *Ahn et al.* modified by *Sekiguchi* in order to obtain a stronger output signal with a particular wavelength.

Regarding claim 11, *Ahn et al.* further teach the routing device is an optical circulator (390, Fig.4B).

Regarding claim 12, *Ahn et al.* further teach the routing device is an optical directional coupler (In different version of wavelength DOM, *Ahn et al.* teach using a coupler, 160, Fig.3B).

Regarding claim 13, as it is understood in view of above 112 problem, *Ahn et al.* further teach a routing device in communication with the polarization controller (In the system of *Ahn et al.* and *Sekiguchi*, *Ahn et al.* teach a circular 390 as a routing device in Fig.4B), the routing device (i) directing the information-bearing signal having the first wavelength to the polarization controller (The signals in the circular are direct to from the output port to the input port because signals are traveling only in clock-wise rotation, Fig.4B of *Ahn et al.*).

The system of *Ahn et al.* modified by *Sekiguchi* differs from the claimed invention in that *Ahn et al.* and *Sekiguchi* do not teach an amplifier in communication for amplifying the converted information-bearing signal (*Suzuki et al.* teach using a post

amplifier to amplify converted signal, 903, Fig.6). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate a post optical amplifier, such as the ones of *Suzuki et al.,* into the system of *Ahn et al.* modified by *Sekiguchi* in order to obtain a stronger output signal with a particular wavelength.

Regarding claim 14, *Ahn et al.* further teach the laser diode is a non-isolated distributed feedback laser diode ([0045]).

Regarding claims 15 and 16, *Ahn et al.* further teach the laser diode is an external cavity laser diode and a Fabry-Perot laser diode.

Regarding claim 18, *Ahn et al.* further teach the laser diode is laser diode is a solid-state laser diode (As discussed above, DBR or DFB is a solid-state laser.

***Allowable Subject Matter***

6. Claims 17,19, 23, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. *Prucnal et al.* (US Pub. No: 2005/0105847) teach all-optical wavelength converter.

2. *Weich et al.* (US Patent No: 5,940,207) teach a wavelength converter.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leming Wang whose telephone number is 571 272 3030. The examiner can normally be reached on 8:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on 571 272 3078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Leming Wang
8/5/2005

KENNETH VANDERPUYE
PRIMARY EXAMINER